

The Examiner stated, in the Final Office Action, that the information disclosure statement filed May 17, 2002, failed to comply with 37 CFR 1.98(a)(2) due to the absence of a copy of U.S. Patent Application Serial No. 09/338,357. Accordingly, a copy of this patent application is included in a supplemental information disclosure statement.

Claims 5-13 stand rejected under 35 U.S.C. 103(a) as being unpatentable over *Tuttle*, U.S. Patent No. 5,020,283 ("*Tuttle*"), in view of *Tzeng*, U.S. Patent No. 5,934,974 ("*Tzeng*"). The Examiner asserts it would have been obvious to one of ordinary skill in the art at the time of the invention was made to have modified the method of monitoring pad wear as taught by *Tzeng* to a pad such as *Tuttle*'s. The Applicants respectively traverse the rejection.

Tuttle teaches a polishing pad for wafers having a face shaped by voids. *Tuttle* teaches reducing surface area of a pad by adding voids in order to have constant, surface contact with a wafer. *Tuttle* also teaches measuring the surface contact between the pad and the wafer. *Tzeng* teaches a belt-driven polishing apparatus using a polishing belt to polish a substrate. The polishing belt has no voids within the surface.

Tzeng also teaches a movable *in-situ* sensor to measure portions of the polishing pad belt along a zigzag trajectory. The sensor detects a reflected laser beam, then determines a distance to the reflection point by triangulation of incident and reflected laser beams. The *in-situ* sensor retraces the same wear path during each revolution of the belt. Accordingly, the measurement trajectory is dependant on the movement of the *in-situ* sensor and the movement of the polishing pad belt. (See, Abstract, Figures 1-3, col. 1, lines 59-68; col. 2, lines 1-24; col. 3, lines 1-24; and col. 4, lines 51-64).

Tuttle and *Tzeng* do not disclose measuring a distance from the main polishing surface to a bottom surface of each of a plurality of the reliefs. Therefore, *Tuttle* and *Tzeng*, alone or in combination, do not teach, show or suggest the subject matter recited in claims 5-13. The Applicants respectfully request the Examiner to withdraw the rejection.

In conclusion, the references cited by the Examiner, neither alone nor in combination, teach, show, or suggest the method or apparatus of the present invention.

Having addressed all issues set out in the office action, the Applicants respectfully submit that the claims are in condition for allowance and respectfully request that the claims be allowed.

The prior art made of record is noted. However, it is believed that the secondary references are no more pertinent to the Applicants' disclosure than the primary references cited in the office action. Therefore, it is believed that a detailed discussion of the secondary references is not deemed necessary for a full and complete response to this office action. Accordingly, allowance of the claims is respectfully requested.

Respectfully submitted,



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APPENDIX

6. (Amended) The method of claim 5, comprising determining total pad wear based on the measured distances, wherein the measuring a distance comprises laser measurements.

7. (Amended) A method for measuring wear of the thickness of a chemical mechanical polishing pad, comprising:

providing a plurality of reliefs in a main polishing surface of the pad, the reliefs being disposed in a predetermined pattern;

measuring a distance by laser from the main polishing surface to a bottom surface of each of a plurality of the reliefs, wherein the pad has a radius; and

determining wear of the pad as a function of the pad radius, based on the relief pattern and the measured distances, to generate a pad wear profile.

8. (Amended) A method for measuring wear of the thickness of a chemical mechanical polishing pad, comprising:

providing a plurality of reliefs in a main polishing surface of the pad, the reliefs being disposed in a predetermined pattern;

measuring a distance by laser from the main polishing surface to a bottom surface of each of a plurality of the reliefs; and

determining a wear rate of a first portion of the main polishing surface of the pad based on the relief pattern and the measured distances.